CASE STUDY REPORT #36
SPICER MEADOWS RESERVOIR
HIGHLAND CREEK

I. Project Description

Spicer Meadows Reservoir was constructed by PG&E in 1929 in Highland Creek, a tributary to the North Fork Stanislaus River. The reservoir when full has a surface area of 218 acres and a volume of 4,300 acre-feet. The project, which consists of several reservoirs in this basin (see Figure 1), was licensed by the Federal Power Commission in July 1951 (FPC License No. 2019) for a term of 50 years.

Water levels in the reservoir are drawn down gradually during the summer to provide for PG&E's Utica Power Division far downstream on the North Fork of the Stanislaus River. In the fall the reservoir is emptied except for a minimum pool. After drawdown, the gates are closed except for a 2 cubic feet per second (cfs) fish release. The storage capacity of Spicer Reservoir is less than 5 percent of the average annual runoff of Highland Creek watershed; therefore, the reservoir is refilled and spilling by December or January of each year.

II. Pre-Project Conditions

A good trout fishery existed downstream of Spicer Meadows Reservoir prior to its construction in 1929. The stream bed was characterized by long sandy pools, shallow riffles and

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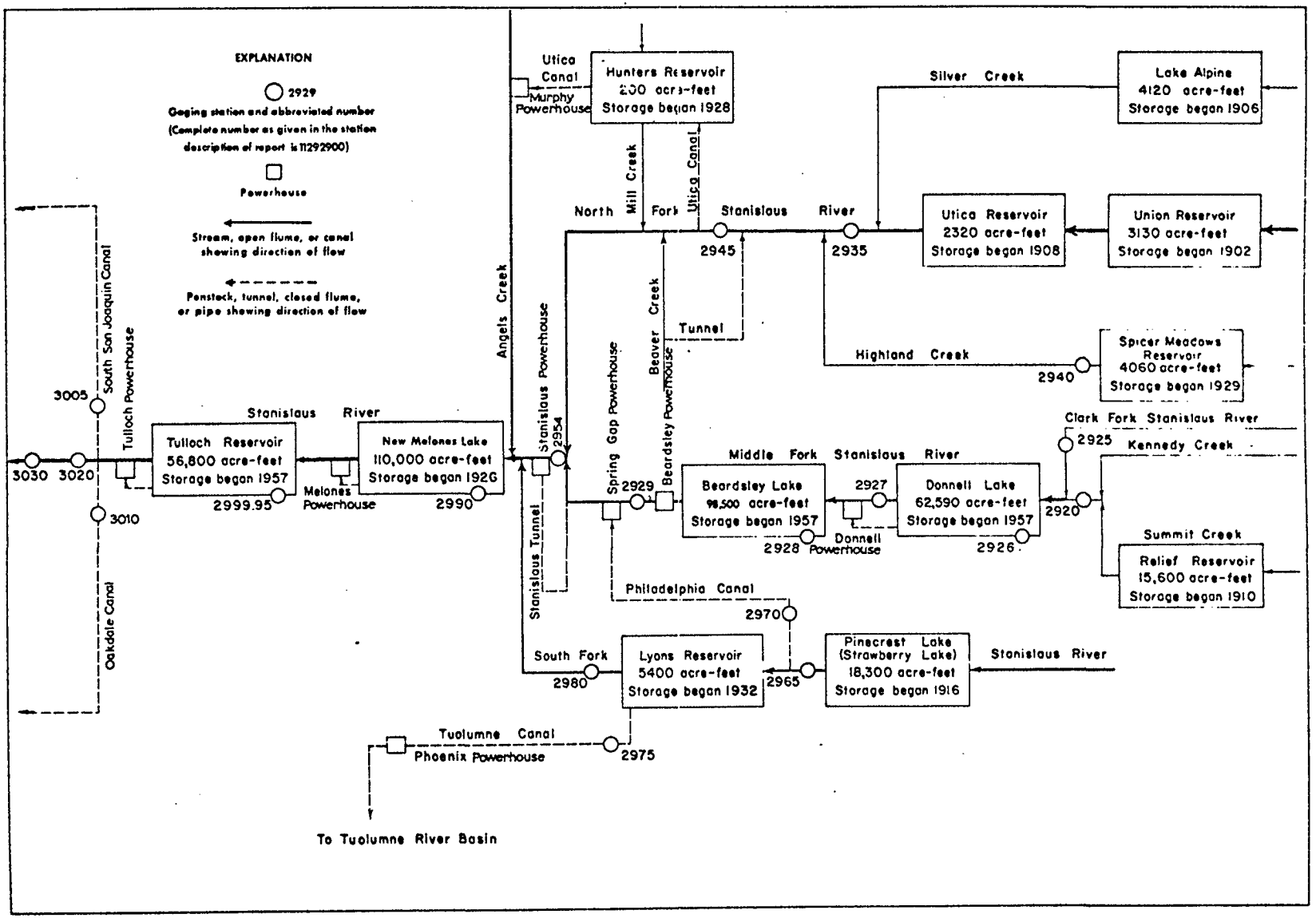

--Schematic diagram showing diversions and storage in Stanislaus River basin.

Figure 1

Source: U. S. Geological Survey, 1973, water resources data for California.

numerous beaver ponds. These beaver ponds provided excellent habitat for trout. The lower sections of Highland Creek near its confluence with the North Fork Stanislaus have a moderate to steep gradient and large rock outcroppings into the stream bed.

Rainbow and brown trout were common above and below the dam site. The area was well known for the large brown trout found in the beaver ponds. No records of pre-project stream flow or present inflow to the reservoir have been obtained. It is assumed that natural flows were typical for this type of mountain stream with peak flows between May and July, depending on snow melt and a regular but decreasing flow from July to November.

III. Project Development

No record, or evidence of any record, was discovered which pertained to fish and wildlife resources as they related to the development of the Spicer Meadows Dam and Reservoir. A minimum flow of 2 cfs is maintained but no agreement between PG&E and the state regarding this flow was discovered (Figure 2).

IV. Post Project

In April 1961, the California Department of Fish and Game began a study to evaluate the effects on the fishery resources of a proposed Calaveras County Water District plan

NO DATA

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PRE-PROJECT:

POST-PROJECT: OCTOBER 1951 — SEPTEMBER 1973
GAUGE STATION NO. 11294000 USGS SURFACE WATER RECORDS VOL 2

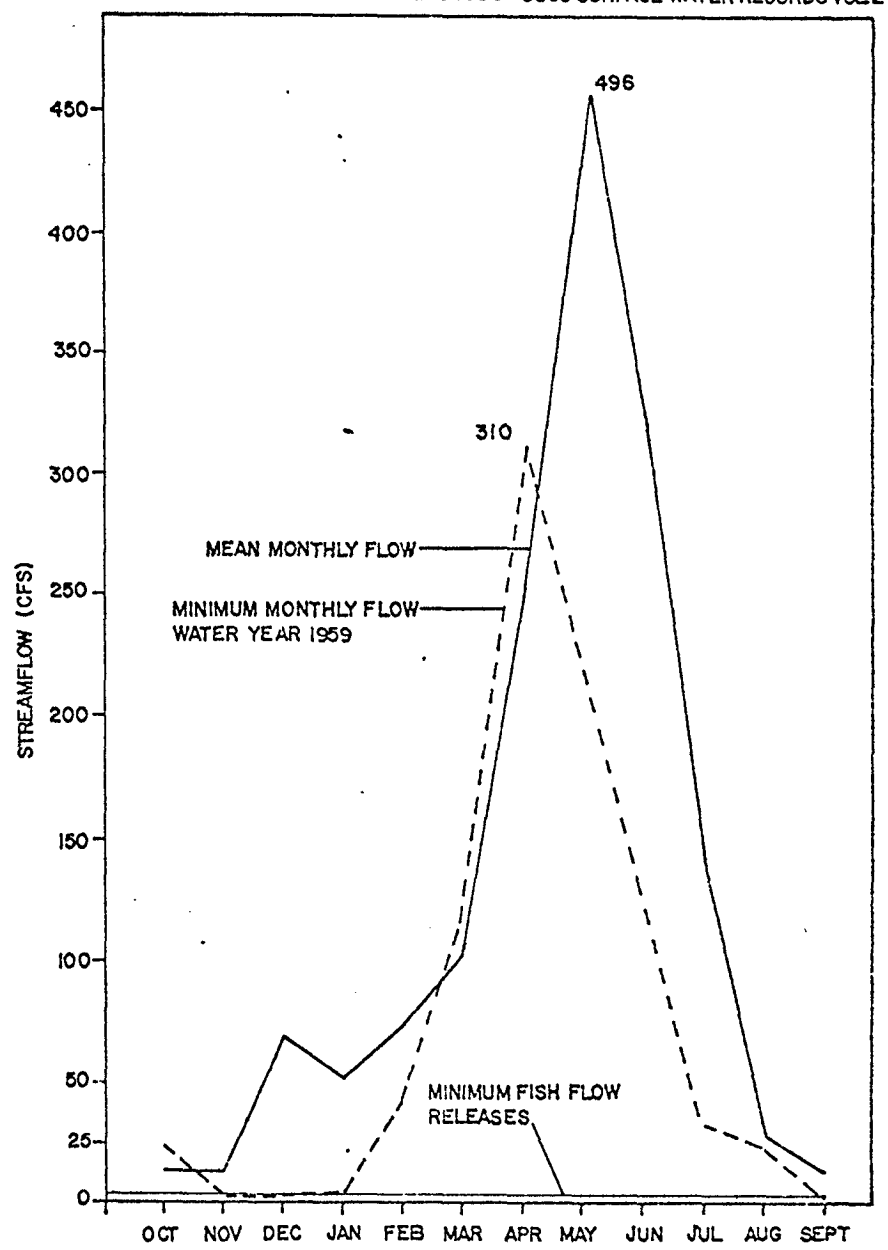

FIGURE 2
STREAMFLOW CONDITIONS, HIGHLAND CREEK
SPICER MEADOWS RESERVOIR

to enlarge Spicer Meadows Reservoir as part of a larger project change. The proposed development included the following features pertinent to Highland Creek:

1. An enlarged Spicer Meadows Reservoir of 130,000 acre-feet capacity.

2. A diversion from the North Fork Stanislaus immediately below Silver Creek to Spicer Meadows Reservoir.

3. A power drop from Spicer Meadows Reservoir to Ganns Reservoir.

4. Ganns Reservoir, with 60,000 acre-feet capacity, at the junction of Highland Creek and the North Fork Stanislaus River.

The Department of Fish and Game recommended mitigation measures designed to lessen damage and to improve conditions where possible. The results of this investigation were published as a special report entitled Proposed Water Development of North Fork Stanislaus River and Its Influence on Fish and Wildlife, Water Projects Branch Report No. 3 (Linn and Collins).

The Department of Fish and Game had not completed the study on Highland Creek prior to the publication of the report. However, the report indicated that the fishery could be maintained if a minimum flow release of 1,000 acre-feet per month (16.5 cfs) or the natural stream flow when less is released from the dam. In making this recommendation, the Department of Fish and Game indicated they had considered the extent of

spawning areas, low summer flows, and shelter and food-producing area at different flow releases. Examination of the Department's project files and the stream files on Highland Creek indicate that the noted investigations had never been completed. We were unable to locate specific data or field records pertaining to abundance of spawning area, low summer flows or shelter and food-producing areas which had been used to make in-stream flow release recommendations.

In March 1975 another evaluation of the fish and wildlife resources in Highland Creek was conducted by private consultants to the Calaveras County Water District. Their proposed project would enlarge three existing reservoirs and create two new ones. The new project would be quite similar to the proposed development in 1961; however, several significant changes were made. The most-recently proposed project would enlarge the existing Spicer Meadows Reservoir to cover 860 acres and contain 52,000 acre-feet when filled.

This 1975 evaluation of the fish and wildlife resources of Highland Creek indicated that the trout habitat is poor and that the stream supports only a sparse population of eastern brook and rainbow trout. Highland Creek flows 5.9 miles downstream to join the North Fork Stanislaus River below Sand Flat. The stream has an unusually wide channel with a high percentage of rubble and boulder substrate which provides better than average habitat for aquatic insects and trout.

There is adequate spawning gravel for natural reproduction at flows between 100 and 200 cfs. Fish and insect production, however, is severely limited by an autumnal, sudden drop in flow from perhaps 50 cfs to 2 cfs and the maintenance of this 2 cfs flow until Spicer Reservoir overflows in mid-winter. The stream has a small population of rainbow trout.

This 1975 study recommended reservoir operating criteria for the proposed Spicer Reservoir as follows:

Spicer Reservoir

Minimum pool no less than 5,000 acre-feet.

Summer flows into Highland Creek -- between 150 and 250 cfs during June, July and August.

September 1 to October 1 -- flow gradually reduced to 16.5.

Winter flow held at 16.5 until reservoir fills and spills -- usually March or April.

V. Conclusions

Pre-project instream flow records were either not recorded or were unavailable; consequently, the instream flow releases from Spicer Meadows Dam could not be compared with natural streamflow conditions. It is assumed that natural flows were typical for this type of mountain stream with peak flows between May and July, depending on snowmelt and a regular but decreasing flow from July to November.

A 20 cfs minimum instream flow reservation is maintained for fish life, although no agreement between PG&E and the State of California regarding this flow was discovered. Figure 2 indicates the mean monthly flows in a normal water year are considerably higher than the minimum fish flow release of 2 cfs.

No record, or evidence of any record, was discovered which pertained to fish and wildlife resources as they related to the 1929 development of the Spicer Meadows Dam and Reservoir. In 1961, the Calaveras County Water District proposed an enlargement of the original Spicer Meadows Dam. In response to this proposed plan, the Department of Fish and Game began investigations to describe the fish and wildlife resources of Highland Creek.

These investigations were directed toward developing mitigation measures to lessen damage and improve environmental conditions where possible. From the information developed, the Department of Fish and Game recommended minimum instream flow releases of 16.5 cfs or the natural stream flow when less. The Department of Fish and Game indicated they had considered the extent of spawning areas, low summer flows, shelter and food-producing areas at different flow releases. However, these field investigations have never been completed.

In March 1975, another evaluation of the fish and wildlife resources on Highland Creek was conducted by private consultants. This study evaluated fishery habitat including food, cover and spawning areas. This study recommended reservoir operating criteria for a proposed enlargement of Spicer Meadows Reservoir. The recommendations are found in the post-project section of this case study.

Conclusions developed from both the 1961 and 1975 investigations indicated that rapid autumnal reduction of flows in Highland Creek, below Spicer Meadows Reservoir, has resulted in a dramatic reduction in the trout fishery. From the limited investigations performed, an increase in flow was recommended to improve the trout fishery habitat. In any case, the lowering of the flow in autumn from the operating release to 2 cfs should occur more gradually than now occurs.

In that the proposed enlargement has not been constructed, the effectiveness of the recommendations designed to preserve fish and wildlife resources has yet to be evaluated. Upon completion of the enlargement project, the Department of Fish and Game is proposing a reevaluation of the instream flow release recommendations after the project has been operating with these release requirements.

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California. Department of Fish and Game. 1962. Proposed water development of North Fork Stanislaus River and its influence on fish and wildlife. Water Projects Report no. 3. 42 pp.